European Commission

The role of automatic stabilisers in the European Union business cycle

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Outline

1. Introduction: Motivation - policy relevance

- **Long-standing debate on merits of fiscal vs monetary policy** in smoothing cyclical fluctuations.
- **2007–2008 crisis revived the debate**:
  - Need to better understand how to set crisis-coping policies effective at stabilising economic activity in times of crisis;
  - Importance of fiscal policy at a time of constrained monetary policy.
- **Focus on** the role of **automatic stabilisers (AS)**:
  - Discretionary fiscal policy measures face many obstacles, e.g. implementation lags and risk of future imbalances.

1. Introduction: Motivation - methodological relevance

- Non-negligible **existing literature**, but **based on two separate approaches**, with little reconciliation:
  - *Micro*: focus on stabilising effects of tax-benefit instruments on household disposable income, using micro data and models - no behavioural and general equilibrium effects;
  - *Macro*: focus on stabilising effects of aggregate taxes and expenditures on macroeconomic variables, using macro data and models - no account for micro heterogeneity and unrealistic tax-benefit system.
- Room for improvement through **development of more integrated and realistic micro-macro approach**, considering both household and aggregate levels.

1. Introduction: This paper

- Develops **new micro-macro method** to compute the stabilising role of AS, **combining** the EC's microsimulation model, **EUROMOD**, and DSGE model, **QUEST**.
- Introduces new link through **estimated tax functions**, extending dynamic scoring exercise in Barrios et al. 2019.
- Applies new method to study the stabilising role of AS following a shock mimicking the **2012 crisis in Italy**.
- Focuses on **3 types of AS**: personal income tax (PIT), employee and employer social security contributions (SSC).

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2. Concepts: What are AS and how they work

- **AS** are fiscal instruments that **"mechanically" smooth cyclical fluctuations** at unchanged policies i.e. without any discretionary government intervention.

- They work through **countercyclical changes in taxes and spending** that arise from the dependance of these instruments on economic conditions.

- The changes in taxes and spending **dampen fluctuations in households' income**, stabilising disposable income, consumption, aggregate demand and output.

2. Concepts: Main types of AS

- **On the taxes side**, main AS are PIT and SSC:
  - Since taxes are a positive function of market income (MY), they will decrease (increase) during downturns (upturns), so disposable income (Y) will change less than MY.
- **On the spending side**, main AS are means-tested benefits and unemployment insurance (UI):
  - Since means-tested benefits are a negative function of MY, they will increase (decrease) during downturns (upturns), so Y will change less than MY;
  - During downturns (upturns) more (less) people qualify for unemployment benefits, so Y will change less than MY.

2. Concepts: Two simple examples

- **PIT** with a 20% tax rate:
  - MY=100, t=0.2, T=20, Y=80;
  - Shock that reduces MY by 50:
    MY'=50, t=0.2, T'=10, Y'=40;
  - A shock of 50 to MY reduced Y by "only" 40, 10 was absorbed by taxes.
- **UI** with a 50% replacement rate:
  - MY=100, rr=0.5, UB=0, Y=100;
  - Shock that induces unemployment:
    MY'=0, rr=0.5, UB=50, Y'=50;
  - A shock of 100 to MY reduced Y by "only" 50, 50 was absorbed by unemployment benefits.

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3. Methodology: A bird's eye view

- **Aim**: analyse role of PIT and SSC in stabilising key macro variables during a downturn like in Italy in 2012.
- **Main steps**:
  1. Derive parameters for **QUEST calibration** using EUROMOD (as in Barrios et al. 2019);
  2. Estimate **tax functions** based on four different tax-benefit systems, obtained by sequentially "switching off" SSCer, SSCee and PIT in EUROMOD;
  3. Simulate **shock** to Italian economy in 2012;
  4. Shock QUEST and compute smoothing capacity of each type of AS on key **macroeconomic variables**.

3. Methodology: Data and sample

- Data used in Steps 1 and 2 based on the **2018 EUROMOD policy system** and data from the **2016** European Union Statistics on Income and Living Conditions (**EU-SILC**) survey.

- Estimation sample for tax functions restricted to individuals with positive labour earnings as sole source of market income and not receiving any benefits or pensions.

3. Methodology: Step 1 - QUEST calibration

- Calibration of **labour market parameters** in QUEST done using data based on EUROMOD and EU-SILC.
- Same procedure as in Barrios et al. 2019:
  - **Labour supply elasticities and participation rates**, by skill level, estimated using a labour supply model running on EUROMOD;
  - **Number of employed/unemployed and average gross wages**, by skill level, computed based on EU-SILC data.

3. Methodology: Step 2 - Tax functions estimation (I)

- In Barrios et al. 2019, tax rates in QUEST calibrated based on implicit tax rates, computed using EUROMOD and EU-SILC data.
- Here, **tax rates modelled as non-linear tax functions**, estimated using EUROMOD and EU-SILC data.
- Estimation done separately for employees and employers.
- **3 possible functional forms**, as in Guner et al. (2014):

$$\begin{aligned} \text{Log specification} \quad & t(y) = \alpha + \beta \log(y) \\ \text{HSV specification} \quad & t(y) = 1 - \lambda y^{-\tau} \\ \text{Power specification} \quad & t(y) = \delta + \psi y^{\varepsilon} \end{aligned}$$

3. Methodology: Step 2 - Tax functions estimation (II)

- **4 scenarios**, in decreasing degree of stabilisation, by sequentially "switching off" SSC and PIT in EUROMOD:
  - *Scenario 1 (Baseline)*: all AS "switched on"
    Full tax-benefit system;
  - *Scenario 2*: SICer "switched off"
    Tax-benefit system without SICer;
  - *Scenario 3*: SICee "switched off"
    Tax-benefit system without SICer and SICee;
  - *Scenario 4*: PIT "switched off"
    Tax-benefit system without SICer, SICee and PIT.

- Each scenario produces an output dataset, used to estimate the tax functions that will be plugged into QUEST.

3. Methodology: Step 3 - Shock simulation

- Shock is calibrated on the basis of the historical decomposition of real GDP growth obtained using the European Commission Global Multi Country Model.
- Decomposition shows that largest share of real GDP growth fluctuations in Italy in 2012 was attributable to domestic demand shocks, with small role of supply shocks.
- Mimicked in QUEST using combination of demand shocks.

3. Methodology: Step 4 - Size of AS computation

- Degree of stabilisation done by each AS assessed by **comparing impact of shock on key macroeconomic variables** in QUEST **under the 4 scenarios**.

- For each scenario, smoothing capacity of AS "switched on" in that scenario assessed **against budget neutral benchmark**, where tax revenues are kept constant.

- Formally, for each variable of interest X, we have:

$$\text{Percentage smoothing} = 1 - \frac{\Delta X}{\Delta X_{benchmark}}$$

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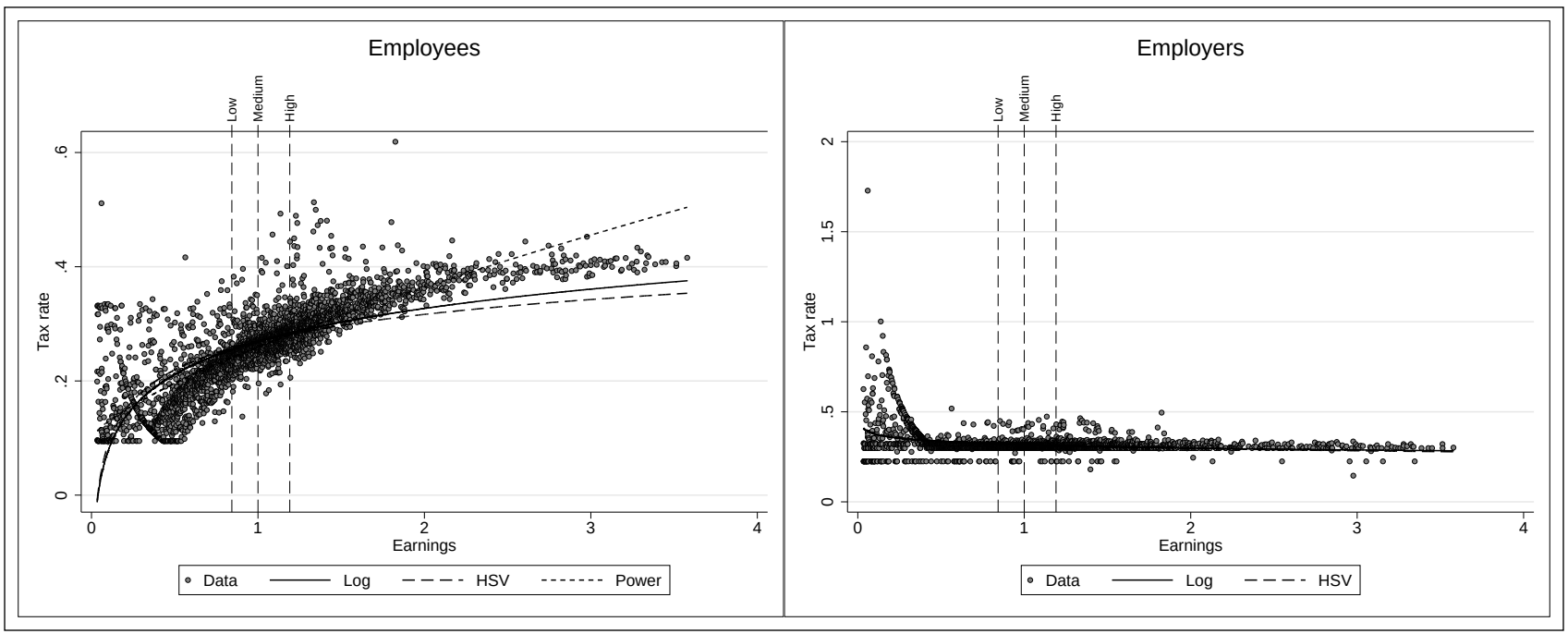
4. Main results: Tax functions

Figure 1: Estimated tax functions (only scenario 1, all AS on)



4. Main results: Parameters of tax functions

Table 1: Estimated parameters of tax functions (only log specif.)

	Employers	**Employees**		
	Scenario 1 (All AS)	Scenario 1 (All AS)	Scenario 2 (No SSCer)	Scenario 3 (No SSC)
	SSCer	**SSCee+PIT**	**SSCee+PIT**	**PIT**
Constant (α)	0.317*** (0.001)	0.269*** (0.001)	0.269*** (0.001)	0.204*** (0.001)
Earnings (β)	-0.026*** (0.001)	0.083*** (0.001)	0.083*** (0.001)	0.106*** (0.001)
Observations	3729	3729	3729	3817

4. Main results: Size of AS

Table 2: Percentage smoothing of key macroeconomic variables done by each AS and in total

	SSCer	**SSCee**	**PIT**	**Total**
Real GDP	2.6	0.6	3.5	6.7
Domestic private demand	2.9	0.8	3.4	7.0
Private consumption	4.5	1.1	4.9	10.5
Private investment	-0.4	0.0	-0.1	-0.5

4. Main results: Sensitivity analysis of size of AS

Table 3: Percentage smoothing of key macroeconomic variables done in total under higher progressivity of employees tax function and higher share of liquidity constrained households

	Original estimates (Table 2)	**Higher progressivity in employee tax function (β)** (from 0.083 to 0.183)	**Higher share of liquidity constrained** (from 40% to 50%)
Real GDP	6.7	8.0	8.5
Domestic private demand	7.0	7.9	9.0
Private consumption	10.5	11.8	13.7
Private investment	-0.5	-0.5	-0.6

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5. Concluding remarks: Main conclusions

- SSC and PIT together smooth 7% of output fluctuations and 11% of private consumption fluctuations induced by a shock as the one that hit the Italian economy in 2012.
- Effect is largest for PIT and smallest for SSCee.
- Higher employee tax progressivity and higher share of liquidity constrained households significantly increase the degree of smoothing of AS.

5. Concluding remarks: Next steps

- Extend analysis to France, Germany and Spain.
- Further develop link between QUEST and EUROMOD by using EUROMOD data to calibrate share of liquidity constrained households in QUEST.
- Investigate the role of benefits as AS, particularly unemployment benefits.
- Study transition path to new steady state in QUEST.

Thank you for your attention!